6. CUMULATIVE EFFECTS

This section discusses potential impacts resulting from other facilities, operations, and activities that in combination with potential impacts from the proposed project may contribute to cumulative impacts. Cumulative impacts are impacts on the environment that result from the incremental impact of the proposed project when added to other past, present, and reasonably foreseeable future actions regardless of the agency (federal or non-federal) or person that undertakes such other actions (40 CFR Part 1508.7). An inherent part of the cumulative effects analysis is the uncertainty surrounding actions that have not yet been fully developed. The CEQ regulations provide for the inclusion of uncertainties in the EIS analysis, and state that "(w)hen an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an EIS and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking" (40 CFR Part 1502.22). The CEQ regulations do not say that the analysis cannot be performed if the information is lacking. Consequently, the analysis contained in this section includes what could be reasonably anticipated to occur given the uncertainty created by the lack of detailed investigations to support all cause and effect linkages that may be associated with the proposed project, and the indirect effects related to construction and long-term operation of the facilities.

Because cumulative impacts accrue to resources, the analysis of impacts must focus on specific resources or impact areas as opposed to merely aggregating all of the actions occurring in and around the proposed facilities and attempting to form some conclusions regarding the effects of the many unrelated actions. Narrowing the scope of the analysis to resources where there is a likelihood of reasonably foreseeable impacts accruing supports the intent of the NEPA process, which is "to reduce paperwork and the accumulation of extraneous background data; and to emphasize real environmental issues and alternatives" [40 CFR Part 1500.2(b)]. The resources and impact areas that were identified with a likelihood of such impacts are (1) greenhouse gases including CO_2 emissions contributing to global climate change, (2) water resources and related issues such as water consumption and water quality, and (3) socioeconomic resources and related issues such as traffic and water and wastewater services.

The lack of impacts to other resources directly affected by the proposed project precludes other resources from this cumulative effects analysis. For air quality, the analysis in Section 4.1.2.2 indicated that maximum predicted concentrations would be less than the significant impact levels. Therefore, additional modeling including other sources and background concentrations is not required under air quality guidelines for regulatory permitting of the facilities (EPA 1990). Correspondingly, the significant impact levels can be used as thresholds for determining the potential for cumulative impacts under NEPA. Because the analysis indicated that maximum predicted concentrations would be less than the significant impact levels, the proposed facilities would not contribute to cumulative air quality impacts.

Each resource analyzed has an individual spatial (geographic) boundary, although the temporal boundaries (time frame) can generally be assumed to equal the 26-year life expectancy of the

proposed facilities. For greenhouse gases including CO_2 emissions, a global spatial boundary was used in the analysis; for water resources, the Susquehanna River watershed was used as the spatial boundary; for socioeconomic resources, Schuylkill County was used.

As discussed in Section 4.1.2.2, an increase in CO_2 emissions at a specific source is effective in altering CO_2 concentrations only to the extent that it contributes to the global total of fossil fuel burning that increases global CO_2 concentrations. The proposed facilities would increase global CO_2 emissions by about 832,000 tons per year, which is about 0.003% of global CO_2 emissions of 26,713 million tons resulting from fossil fuel combustion in the year 2000. Thus, increases from the proposed facilities would be large in terms of number of tons per year but small in comparison with global totals.

Water consumption by the proposed facilities would contribute to a trend of increasing diversion and consumptive use of water from the Susquehanna River Basin.[1] The Susquehanna River Basin Commission (2003) found that diversions and consumptive uses of water from the 27,510-square-mile Susquehanna River watershed increased 85% between 1970 and 2000 (from a daily maximum of 270 million gal per day in 1970 to a maximum of about 500 million gal per day in 2000) and could increase an additional 55% by 2020. In this region, consumptive uses and diversions that affect surface waters could adversely affect the maintenance of minimum stream flows needed to sustain aquatic habitats or dilute treated wastewater effluents. Langland et al. (2001) did not find any long-term trend in Susquehanna River stream flow during the period from 1985 to 1999, but reported large variability in flow. Increased industrial use of mine pool water has been a small contributor to the basin-wide trend toward increased consumptive use. Veil et al. (2003) identified 5 power plants, including the Gilberton Power Plant, in the anthracite coal mining region that began operation after 1980 and use mine pool water from the Susquehanna River Basin for cooling and other purposes. These plants withdraw a total of about 3,600 gpm (more than 5 million gal per day); the majority of this water is discharged after use, but a fraction is used consumptively. The proposed facilities' net consumption of 2,290 gpm (about 3.3 million gal per day) from the Susquehanna River watershed would contribute to the general trend of increased water consumption, adding about 1% to the region's total water consumption as of 1970 or about 0.7% to consumption as of 2000. The 1985–99 stream flow record suggests that the watershed could accommodate this added consumption.

Several initiatives to enhance water quality are ongoing, planned, or proposed for the Mahanoy Creek watershed and the adjacent Shamokin Creek watershed, which is interconnected by underground mine workings with downstream portions of the Mahanoy Creek watershed. Initiatives being undertaken by government, voluntary groups, and private entities include (1) construction and maintenance of artificial wetlands and other passive treatment systems at sites where acid mine drainage emerges from abandoned mines; (2) filling of abandoned surface mine pits; and (3) removal of abandoned coal refuse piles with subsequent grading and planting of vegetation at the site to reduce the amounts of sediments, acid mine drainage, and coal waste runoff entering streams

[1] Diversion refers to the transfer of water to a different watershed. Water is considered to be used consumptively when evaporated, transpired by plants, or incorporated into manufactured products.

(PDEP 2004d). The proposed project would contribute to efforts to improve water quality in the Mahanoy and Shamokin Creek watersheds by reducing the discharge of Gilberton mine pool water to Mahanoy Creek, removing anthracite culm piles, filling mine pits, and reclaiming mined lands.

Construction and operation of the proposed facilities would have socioeconomic impacts that could contribute to cumulative impacts on the area's socioeconomic resources. The Pennsylvania Department of Environmental Protection recently identified 2 areas of proposed future growth, the Interstate 81 corridor and the State Route 61 corridor, located within a few miles of the proposed project site in Schuylkill County (PDEP 2002). Along the Interstate 81 corridor, the Schuylkill Economic Development Corporation is attracting industrial development to the Schuylkill Highridge Business Park and Mahanoy Business Park. The Schuylkill Highridge Business Park is the largest mixed-use business park in Pennsylvania, with a 2,000-acre corridor along Interstate 81 between exits 116 and 119. The Park's first major tenant, Lowe's Companies, Inc., has constructed a 1.2 million square ft regional distribution center on a 165-acre parcel. Similar developments are either underway or will begin construction in the Highridge Business Park within the next few years (SEDCO 2004):

- Wegman's Food Markets, Inc., distribution complex (1 million square ft of building space to be constructed by 2008);
- Robert Patillo Properties, Inc., (455,000 square ft of building space already constructed; another 1.8 million square ft to be constructed in the near future for a Sears, Inc., distribution center); and
- Wal-Mart, Inc., frozen foods distribution center (900,000 square ft of building space to be constructed).

The 500-acre Mahanoy Business Park is located near exit 131 of Interstate 81 on Morea Road near Mahanoy City, about 3 miles east of the proposed project site. Although no buildings have been constructed in the Mahanoy Business Park, the site is serviced by water, wastewater, and gas lines and is likely to be developed in the future. The Mahanoy Business Park could accommodate 2 million square ft of building space (SEDCO 2004). Except for these ongoing and planned industrial developments within the Schuylkill Highridge Business Park and Mahanoy Business Park, no plans exist for large-scale industrial, commercial, or residential developments within the next few years in Schuylkill County (Frank Zukas, Schuylkill Economic Development Corporation, personal communication to J. W. Saulsbury, ORNL, September 22, 2004).

The Pennsylvania Department of Transportation has identified 9 future road projects in Schuylkill County (PDOT 2004), but 6 of them are far enough removed from the proposed project site that cumulative impacts are not likely. However, 3 of the 9 road projects could contribute to cumulative impacts because they are in close proximity to the proposed project site or are large enough to have countywide impacts: (1) Mahanoy City Pipe Replacement (under State Route 54 near the Mahanoy City line); (2) Interstate 81 Bridge Replacement Phase 2 (near Pine Grove Township); and (3) State Route 924 Rock Scaling (on a 1-mile section north of Frackville) (PDOT 2004).

Construction of the proposed project could combine with ongoing and planned activities, particularly industrial development in the Schuylkill Highridge Business Park and Mahanoy Business Park, to create cumulative impacts to socioeconomic resources. The largest contribution to cumulative impacts from the proposed facilities would be the presence of 1,000 workers during the 6-month peak construction period. Such a large work force could combine with other activities to adversely affect water and wastewater services and the flow and safety of vehicular traffic. The proposed facilities' contributions to cumulative socioeconomic impacts would continue during project operations, but at a smaller scale because fewer workers would be present.